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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Industrial and Production Engineering

Semester End Examination; May/June - 2018

Theory of Metal Forming

Time: 3 hrs

Max. Marks: 100

Note: Answer **FIVE** full questions, selecting **ONE** full question from each unit.

UNIT - I

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|------|-----------------------------------------------------------------------------|----|
| 1 a. | Define Metal Forming Process. Explain how Forming Processes are classified? | 10 |
| b. | Derive an expression for mechanics of metal working by slab method. | 10 |
| 2 a. | Explain how the strain rate will affect the metal working progress? | 7 |
| b. | Explain the role of lubrication in metal working. | 6 |
| c. | Explain the effect of residual stresses on metal working. | 7 |

UNIT - II

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|------|------------------------------------------------------------------------|----|
| 3 a. | With neat sketches, explain the different types of forging equipments. | 10 |
| b. | Derive an expression for forging in plane strain. | 10 |
| 4 a. | With a neat sketch, explain the planetary mill in Rolling Process. | 7 |
| b. | Differentiate between Hot-Rolling and Cold-Rolling. | 8 |
| c. | Write a note on Rolling Defects. | 5 |

UNIT - III

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|------|--------------------------------------------------------|---|
| 5 a. | With a neat sketch, explain Indirect Extrusion Method. | 7 |
| b. | With a neat sketch, explain Tube Extrusion. | 7 |
| c. | Explain Extrusion Ratio. | 6 |
| 6 a. | With a neat sketch, explain wire drawing process. | 7 |
| b. | With a neat sketch, explain Tube-Drawing process. | 8 |
| c. | Explain the Residual Stresses in Rods and Tubes. | 5 |

UNIT - IV

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|-------|-------------------------------------------------------------|---|
| 7. | Explain the following processes with a neat sketches : | |
| (i) | Rubber Forming | 6 |
| (ii) | Bending | 7 |
| (iii) | Shearing. | 7 |
| 8 a. | Define spring back. Explain the elimination of spring back. | 8 |
| b. | Explain Deep Drawing Process with a sketch. | 7 |
| c. | Explain spinning operation. | 5 |

UNIT - V

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|-------|----------------------------------------------------------------|----|
| 9 a. | Explain the principles of HERF process. | 7 |
| b. | Explain Electro-discharge forming process with a neat diagram. | 7 |
| c. | List the advantages of HERF process. | 6 |
| 10 a. | Express Powder Metallurgy process with a neat sketch. | 10 |
| b. | Explain Explosive forming with a sketch. | 6 |
| c. | List the limitations of powder metallurgy processes. | 4 |

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